(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 March 2002 (28.03.2002)

PCT

(10) International Publication Number
WO 02/25363 A1

(51) International Patent Classification[7]: G02F 1/1335

(21) International Application Number: PCT/PL01/00074

(22) International Filing Date: 28 August 2001 (28.08.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
P.342694 20 September 2000 (20.09.2000) PL

(71) Applicant and
(72) Inventor: **MYSLOWSKI, Wlodzimierz** [PL/PL]; ul. Skalna 50, 43-300 Bielsko-Biala (PL).

(74) Agent: **RYGIEL, Andrzej**; Kancelaria Rzecznika Patentowego, P-102, PL-43-301 Bielsko-Biala (PL).

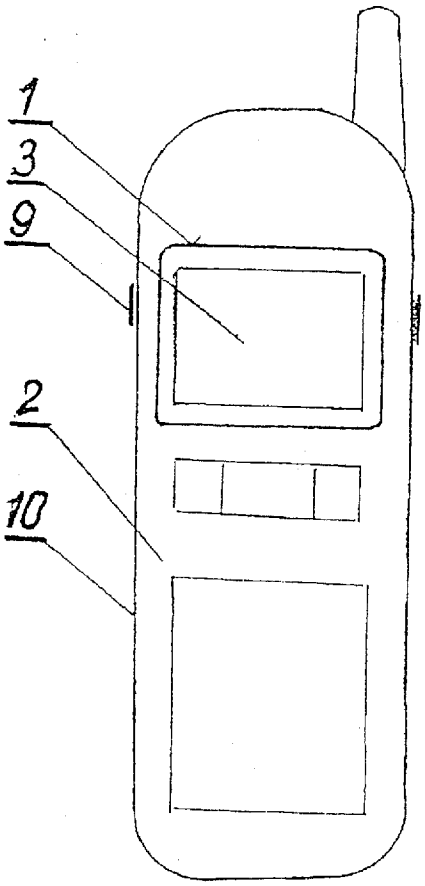
(81) Designated States *(national)*: AE, AU, BA, BG, BR, CA, CN, CO, CR, CU, CZ, DM, DZ, EE, HR, HU, ID, IL, IN, JP, KP, KR, LK, LR, LT, LV, MA, MG, MK, MN, MX, NO, NZ, RO, SG, SI, SK, UA, US, UZ, VN, YU, ZA.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *with international search report*

[Continued on next page]

(54) Title: DISPLAY SCREEN DEVICE, IN PARTICULAR FOR A MOBILE PHONE



(57) Abstract: The object of the inventioln is a screen of display-equipped devices, in particular mobile phones, which facilitates data reading in unfavourable lighting conditions. A screen (1) of display-equipped devices, in particular mobile phones (2), equipped with liquid displays (3) is made of at least two adjacent polarisation layers (4) and (5) located at least within data reading area (6) with one of the layers (4) or (5) fixed, and the other one (4) or (5) rotatable in the plane parallel to the adjacent layer. One of the polarisation layers (4) or (5) contains preferably areas (7) equipped with focal elements (8) which magnify the screen reading.

WO 02/25363 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

DISPLAY SCREEN DEVICE, IN PARTICULAR FOR A MOBILE PHONE

The subject of the invention is a screen for display-equipped devices, in particular mobile phones which facilitates reading of data in unfavourable lighting conditions.

Commonly known screens for display-equipped devices, in particular mobile phones, are made of materials which reflect light, so that reading of the information displayed on the screen is difficult and, in extreme cases, even impossible.

The object of the invention is to design a new generation of screens for display-equipped devices, in particular mobile phones, which shall enable to read the displayed information irrespective of lighting conditions, also by users with impaired eyesight.

The screen of display-equipped device, in particular mobile phone, with liquid crystal display according to the invention is characterised in that it is made of at least two adjacent polarisation layers in the shape of discs or sectors of discs, located at least within the data reading area. One of the layers is fixed, and the other one can be rotated in the plane parallel to the adjacent one. One of the polarisation layers preferably contains areas, equipped with focal elements, which magnify the screen reading. The upper polarisation layer preferably has a pivotal fixing element, and is equipped with the elements which enable turning it, located at least on one side of

the phone body. The movable polarisation layer is preferably located as the outer screen layer, and is preferably equipped with screen illumination switch.

The screen of display-equipped devices, in particular mobile phones, allows to use the phone irrespective of the intensity of light, i.e. with the maximal lighting of the screen by sunshine as well as at dusk and at night. The polarisation layers prevent light reflection, while focal elements allow sight-impaired people to use the phone. At the same time, using the phone at night is possible thanks to the screen illumination, which can be turned on.

The sample embodiment of the object of the invention is presented in the drawing, where Fig. 1 presents the front view of a mobile phone, Fig. 2 presents the section of the two polarisation layers, Fig. 3 presents an example of the view of a mobile phone screen equipped with magnifying elements, Fig. 4 presents the upper view of external shape of the polarisation layer discs, and fig. 5 presents the upper view of external shape of the polarisation layer disc sector.

As shown in the drawing, the screen 1 of display-equipped devices, in particular mobile phones 2, equipped with liquid crystal displays 3 is made of at least two adjacent polarisation layers 4 and 5 in the shape of discs or sectors of discs. The polarisation layers 4 and 5 should be located within the data reading area 6 or constitute the whole of the screen 1 surface. One of the layers 4 or 5 is fixed, and the other one 4 or 5 can be rotated in the plane parallel to the adjacent layer. Preferably, one of the polarisation layers 4 or 5 contains areas 7, equipped with focal elements 8, which magnify the screen reading, and one of the polarisation layers 4 or 5 is fixed pivotally in relation to the other one 4 or 5, and is equipped with the elements 9 which enable its movement, located at least on one side of the phone body 10. The movable polarisation layer 4 or 5 may be preferably located as the outer screen 1 layer, and be preferably equipped with screen 1 illumination switch 11.

Patent claims

1. The screen of display-equipped devices, in particular mobile phones, equipped with liquid crystal displays, characterised in that it is made of at least two adjacent polarisation layers (4) and (5) located at least within the data reading area (6) with one of the polarisation layers (4) or (5) is fixed, and the other polarisation layer (4) or (5) can be rotated in the plane parallel to the adjacent layer.

2. Screen according to claim 1. characterised in that one of the said polarisation layers (4) or (5) contains preferably areas (7) equipped with focal elements (8) which magnify the screen (1) reading.

3. Screen according to claim 1. or 2. characterised in that the said polarisation layer (4) or (5) is preferably fixed pivotally in relation to the other polarisation layer (4) or (5) and is equipped with the elements (9) which enable its movement located on at least one side of the phone body (10).

4. Screen according to claim 1. or 2. or 3. characterised in that the movable polarisation layer (4) or (5) is preferably located as the outer screen (1) layer.

5. Screen according to claim 1. or 2. or 3. or 4. characterised in that the movable polarisation layer (4) or (5) is preferably equipped with screen (1) illumination switch (11).

6. Screen according to claim 1. or 2. or 3. or 4. or 5. characterised in that the movable polarisation layers (4) or (5) are disc-shaped.

7. Screen according to claim 1. or 2. or 3. or 4. or 5. characterised in that the movable polarisation layers (4) or (5) preferably have the shape of disc sectors.

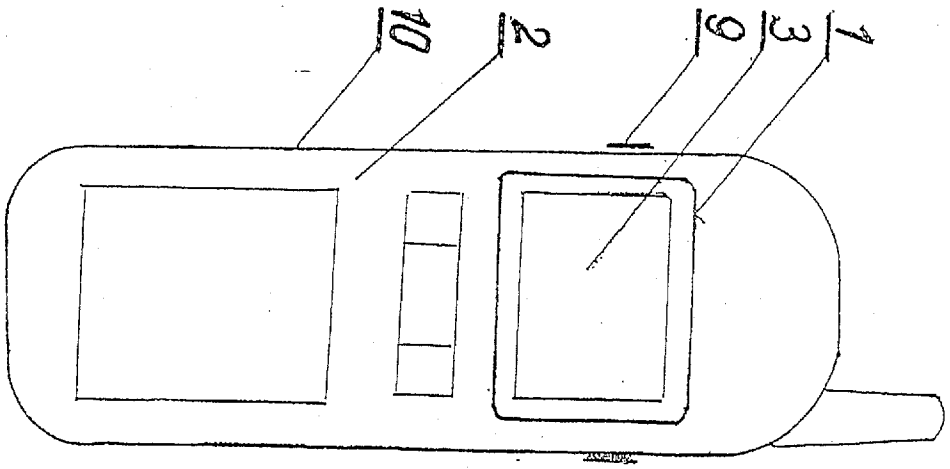


Fig. 1

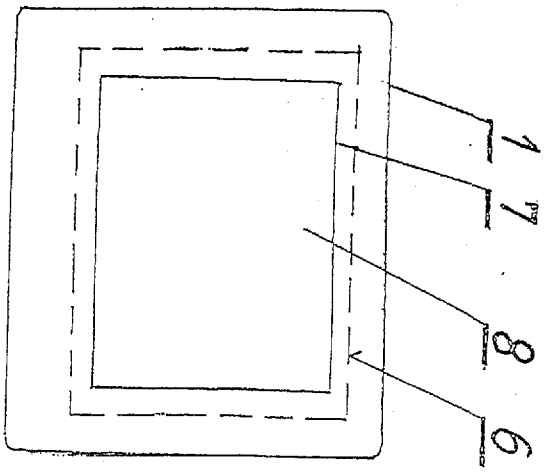


Fig. 3

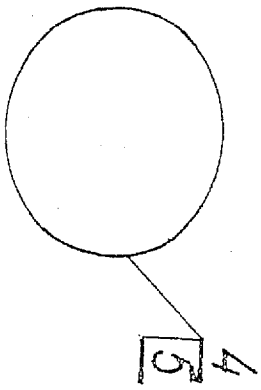


Fig. 5

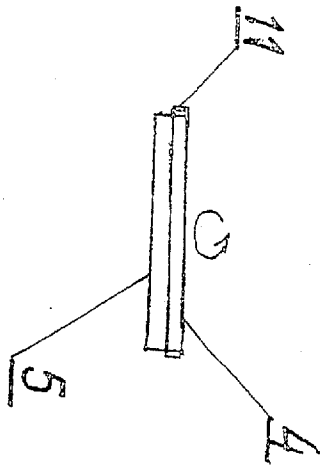


Fig. 2

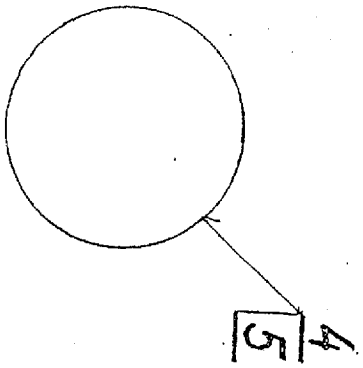


Fig. 4

INTERNATIONAL SEARCH REPORT

International Application No
PCT/PL 01/00074

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G02F1/1335

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G02F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 086 354 A (BASS JOHN S ET AL) 4 February 1992 (1992-02-04) column 3, line 48 - line 56 column 4, line 32 - line 42 figures 2,4	1-7
A	US 4 707 859 A (NUDD GRAHAM R ET AL) 17 November 1987 (1987-11-17) column 5, line 31 - line 46 figure 6	1-7
A	EP 0 890 864 A (CITIZEN WATCH CO LTD) 13 January 1999 (1999-01-13) column 21, line 1 -column 23, line 30	1-7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 December 2001	27/12/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/PL 01/00074

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5086354 A	04-02-1992	WO 9313446 A1	08-07-1993
		US 5589980 A	31-12-1996
US 4707859 A	17-11-1987	NONE	
EP 0890864 A	13-01-1999	EP 0890864 A1	13-01-1999
		US 6115091 A	05-09-2000
		WO 9737270 A1	09-10-1997